

Transformer Retrofit Energy Savings Opportunity





Transformers

A 30 year hidden tax of up to 10% behind locked doors

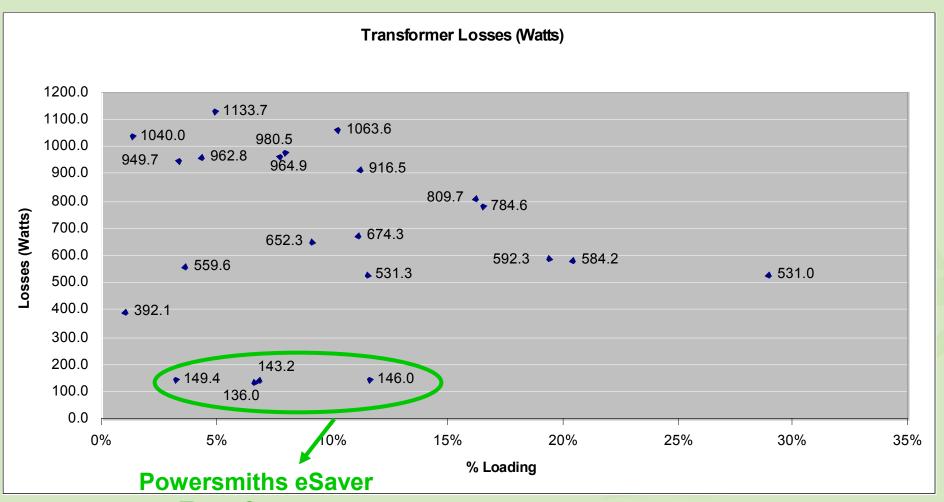


Retrofit = Operational Risk Management

- Old units near mean-time-to failure
- Transformer is much more important than its cost
- Failure mode is expensive it feeds all work space computers
- Could be down for a day or more
- Panic replacement
 - Off the shelf unit
 - Probably won't fit footprint
 - Will have minimum legal efficiency
 - Expensive electrical rework, even more if relocation required
- Existing Unit is wasting energy 24hr/day



Proven, significant, real world reduction in losses



Transformers

(Losses for 75 kVA Transformer)



Transformer Industry Context



Federal Register Final Rule, April 2013 Raises Minimum Legal Efficiency

- Outlaws current minimum EPACT 2005/NEMA TP1
- Takes effect Jan 1, 2016

23336

Federal Register/Vol. 78, No. 75/Thursday, April 18, 201

DEPARTMENT OF ENERGY

10 CFR Part 431

[Docket No. EERE-2010-BT-STD-0048]

RIN 1904-AC04

Energy Conservation Program: Energy Conservation Standards for Distribution Transformers

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of

Energy.

ACTION: Final rule.

FOR FURTHER INFORMATION CONTACT:

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Part II

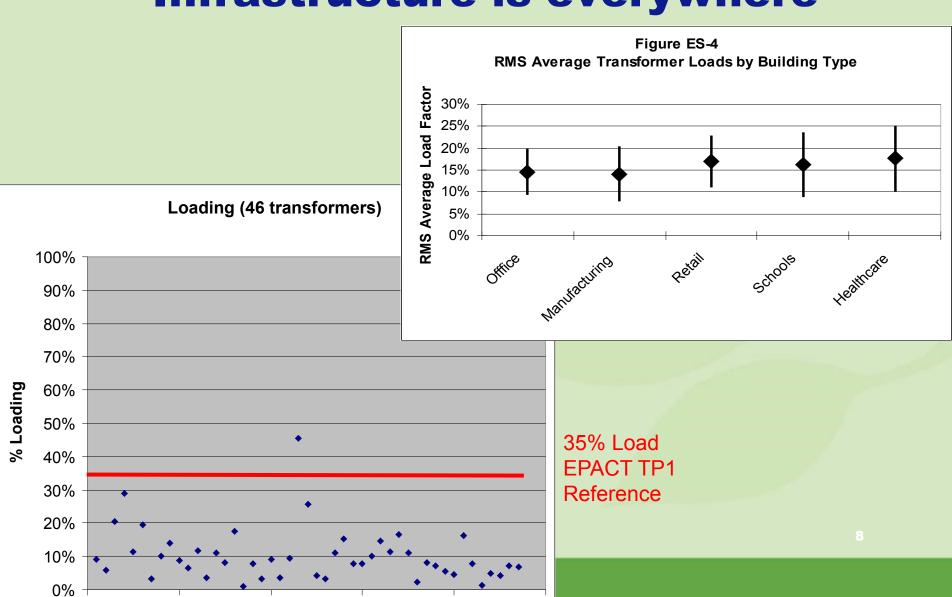
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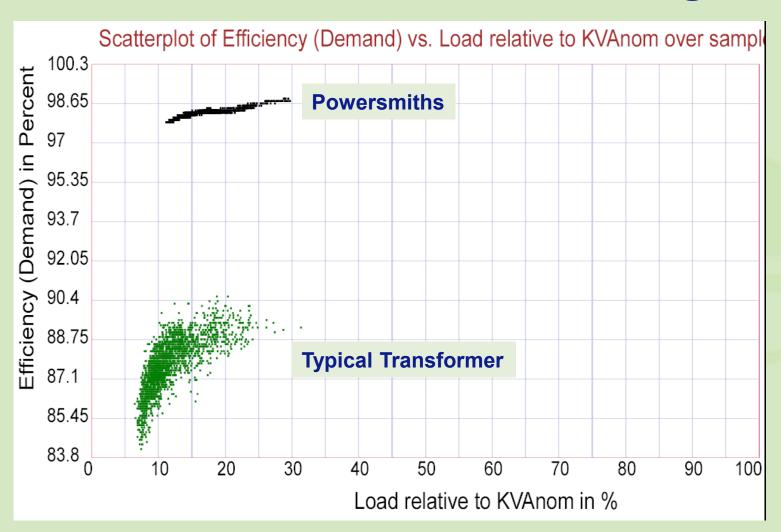
Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule



Oversized Electrical Infrastructure is everywhere



Powersmiths optimizes efficiency for real world load to deliver real savings





Powersmiths Transformer Retrofit Best Practice Details



Stage 1 - Project Qualification

- Need to assess the transformer retrofit opportunity
 - Identify scope of work
 - Identify end of life infrastructure
 - What is ROI or internal IRR threshold?
 - LoanStar Financing Available?



Stage 2 – Preliminary Assessment

- If payback, scope of work, and financing are acceptable:
 - Prepare high level assessment
 - Use single line, inventory management list, initial site personnel discovery audit.
 - Provide BOM information to Powersmiths Support Engineers
 - Will prepare initial project savings & payback
 - Evaluate any rightsizing/consolidation opportunities
- Review opportunity





Stage 3 -Define M&V Scope Get it right

- M&V is optional for some projects –
 Absolutely required for others
 - Validates Product Performance
- Does customer require M&V ?
- If yes: define scope
 - Be sure to sample enough units different buildings, manufacturers, kVAs
 - Need a decent representative sample
- Prepare proposal of full project based on agreed scope with customer



Optional Stage 4 - Green Start

- Pick a transformer and replace it as case study
- Measure baseline load and losses (spot o.k. if straight replacement, longer if rightsizing as per rightsizing scope)
- Provide Savings Report to customer
- Buyboard Guaranteed Pricing for installation services and transformers





Stage 5 - Detailed Audit

- Detailed Audit
 - Based on defined scope
 - Performed by Powersmiths Certified Auditor
 - Submit loading data if rightsizing is being done
 - Powersmiths Support Engineers will
 - review audit forms
 - photos
 - loading data (if rightsizing has been selected by the customer)
 - prepare detailed audit report
 - Consider having Powersmiths Certified Electrical
 Contractor who will be quoting installation either do the audit or accompany the auditor



Stage 5: Detailed Inventory Audit Tag, nameplate data, constraints







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Stage 5: Detailed Audit Understand Terminal Layout Needs



Stage 5: Detailed Audit Define Electrical & Footprint Needs

- Footprint, conduit, terminal layout etc. to minimize install cost
- Impedance requirements to avoid inrush, fault level issues
- UL Listed for 2" rear clearance





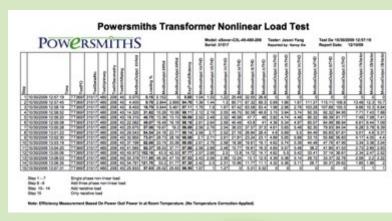


Transformer Options





Factory M & V



- ISO 17025 CSA Certified Efficiency Test Lab
- Independently audited per ISO requirements
- Load bank: Combines Linear and Nonlinear loads
- Enables Apple to Apples Proof of performance
 - Match measured baseline field load profile
 - Loading range and load current THD
 - Avoids mismatch due to different before/after field loading
- Report signed by Licensed Professional Engineer

Transformer Integrated Metering & Logging Arc Flash Safe & quick access to data

- Track energy intensive systems or equipment
- History of infrastructure loading

Embedded long term Cyberhawk Express Logger Accessible locally without opening enclosure



Capable of real-time push to WOW
Connect to BAS
Access port for efficiency spot checks



Safety First – Eliminates Arc Flash Risk of opening enclosure





- Quick, costeffective access
- thermal scans
- metering
- maintenance



Safety First – Eliminates Arc Flash Risk of opening enclosure

Stage 6 – Finalize Project Scope Pricing & Contractor Install Review

- Confirm for quotation:
 - List of Units to be replaced, options, special size units, factory tests, post install field measurements...
- Electrical Contractor review how Powersmiths made-to-measure construction reduces install cost

Stage 7 – Order Entry & Manufacturing

- P.O. to Powersmiths finalize delivery schedule
- Confirm factory testing requirements
- Coordinate shipment to site and install
- Powersmiths will perform
 - Engineering validation of order for custom footprints, terminal placement, impedances...
- Perform Certified Efficiency Testing and reports per scope



Stage 8: Manufacturing Matching Tags - old & new







Stage 8: Manufacturing Powersmiths Easy Skid = Easy to move into place & less waste



Traditional Skid



Stage 9 – Full Circle Project Closeout With Customer

- Present final report to customer
- Review customer satisfaction with whole project
- Case study?
- Next phase ?
- Provide feedback





Any Questions?

Thank you

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